POVERTY REDUCING DIRECTIONS OF REFORMS: AN APPLICATION OF CONCENTRATION CURVES TO CONSUMPTION SUBSIDIES IN BELARUS*

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ABSTRACT

In applied works poverty reducing strategies are often analysed by calculating poverty indices before and after the simulated policy. Recent developments by Yitzhaki and Thirsk (1990) and Yitzhaki and Slemrod (1991), drawing on the theory of stochastic dominance, have identified the correspondence between non-intersecting concentration curves and welfare improving and poverty reducing changes, respectively. Consumption dominance conditions have recently been derived by Makdissi and Wodon (2000) for any order of restricted stochastic dominance. None of these papers, however, considers poverty by subgroups. In this paper, we consider the opportunity of gaining information on poverty reduction strategies from commodity concentration curves by subgroups of population when consumption subsidies are changed. Conditions are derived for the FGT class of poverty indices. Results are based on the 1997 Household Survey from Belarus, considering subsidies on rents and utilities, health care and public transport in six groups of population: workers with children; married couples; singles; single parents; pensioners with children; other households with children.

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Introduction

A fundamental aim of the gradual approach in reforming both the welfare state and consumption subsidies in transition economies is that of obtaining the highest anti-poverty effect without imposing excessive stress on the public sector budget. In order to achieve this result, it is crucial to obtain as much information as possible on feasible directions of reforms starting from an initial state. One common problem of anti-poverty strategies, however, is that of designing a poverty line and to test whether results are robust to different specifications of it. Recent developments by Yitzhaki and Thirsk (1990) and Yitzhaki and Slemrod (1991) have identified a correspondence between non-intersecting concentration curves and welfare improving directions of reforms. Consumption dominance conditions have recently been derived by Makdissi and Wodon (2000) for any order of restricted stochastic dominance. None of these papers, however, considers poverty by subgroups. In other words, an overall poverty reducing policy may well be poverty increasing for some population groups and poverty reducing for others.

This paper highlights this issue by deriving conditions for poverty reducing directions of reforms by population groups for the FGT class of poverty indices. Necessary and sufficient conditions are based on the dominance of sub-group concentration curves (SGCC) in the relevant range. Empirical evidence is here shown for Belarus, using data for 1997, for consumption subsidies on rents-utilities (RU), public transports (PT) and health care (HC). Reforming consumption subsidies is still a high priority in Belarus, if one considers that, for example, on average, production costs on utilities are covered at 30 per cent (with water at 22 per cent and electricity at 50 per cent).

Reforming subsidies is therefore likely to cause non negligible effects on poor households. Furthermore, these effects might be asymmetric among population groups. The approach here used allows us to investigate whether revenue-neutral changes of consumption subsidies are in fact poverty reducing for all population groups exploiting the minimal informational requirement implicit in the non-intersecting concentration curves approach.

The paper is organised as follows: the first section will set the theoretical framework, showing conditions for sub-group concentration curves; The second section will briefly describe the data and some statistical figures; the third section will discuss results; the last section concludes.

Theoretical setting

POVERTY REDUCING DIRECTIONS OF REFORM: TOTAL POPULATION

Define the quantity consumed of two commodities as $x_1(\mathbf{q}, y)$ and $x_2(\mathbf{q}, y)$, where $\mathbf{q}$ is the consumption price vector and y is income. Assume that both goods can be either taxed or subsidised or both. Define the net tax rate n_1 and n_2 respectively, where $n_i=(t_i - s_i)$, $i=(1,2)$ with t_i indicating the non-negative tax rate and s_i indicating the non-negative subsidy rate.

The problem here considered is how to choose, with a minimal informational set, on which good taxes should be lowered most or subsidies increased most in order to reduce a poverty index of the Foster-Greer-Thorbecke (FGT) class.

To this purpose, let us define an explicit measure of individual welfare. In general, the indirect utility function of an individual can be denoted as:

[1] $$V = V(\mathbf{q}, y)$$

As the price vector $\mathbf{q}$ is distorted by either taxes or subsidies or both, a reference price vector is defined as $\mathbf{p}$. This latter vector may be interpreted, for example, as a world price vector.

To the purpose of the analysis, one can assume the «equivalent income» as the appropriate measure of welfare, as in King (1983). The equivalent income is «that level of income which, at the reference price vector, affords the same level of utility as can be attained under the given budget constraint» (King, 1983). Therefore, given [1], the following equivalence can be set:

[2] $$V(\mathbf{q}, y) = V(\mathbf{p}, \psi)$$

where ψ is the equivalent income. By inverting the indirect utility function, equivalent income may be expressed in terms of the cost function:

[3] $$\psi = c(\mathbf{p}, V)$$

Expressions [2] and [3] may be then combined to get a direct expression for equivalent income:

[4] $$\psi = \psi(\mathbf{p}, \mathbf{q}, y)$$

Expression [4] is the amount of lump-sum income necessary to keep the consumer at the new set of prices at the same level of utility as under the reference price vector.

A poverty line can therefore be defined accordingly. Since ψ is monotonically increasing with y, an arbitrary cutoff may be set at a given level z_ψ. For simplicity of notation, we will indicate this cutoff simply as z.

Now define first a poverty index of the FGT class:

[5] $$P_\alpha = \int_0^z \left(\frac{z - \psi(\mathbf{p}, \mathbf{q}, y)}{z} \right)^\alpha f(y)dy$$

where $f(y)$ is the density function of lump-sum income and α is the poverty aversion parameter. Define then government revenue as:

[6] $$R = \int_0^m \left(n_1 x_1(\mathbf{q}, y) + n_2 x_2(\mathbf{q}, y)\right) f(y)dy$$

where m is the maximum level of income, demands for goods depend on lump-sum income and the «distorted price vector» $\mathbf{q}$. This vector is by assumption obtained by summing the net tax rate to the base price vector:

[7] $$q_i = p_i + n_i .$$

Now, suppose that the government's fiscal rule is to change the net tax rate n_1 with revenue neutrality. This strategy, as above, implies changing n_2 in an opposite direction. Differentiating [6], one can write the revenue-neutral change as follows:

[8] $$\frac{dn_2}{dn_1} = -\frac{\int_0^m \left(x_1 + n_1 \frac{\partial x_1}{\partial n_1} + n_2 \frac{\partial x_2}{\partial n_1} \right) f(y)dy}{\int_0^m \left(x_2 + n_1 \frac{\partial x_1}{\partial n_2} + n_2 \frac{\partial x_2}{\partial n_2} \right) f(y)dy}$$

By [7] $\frac{\partial q_i}{\partial n_i} = 1$; therefore, the effect on the poverty index would be:

[9] $$\frac{dP_\alpha}{dn_1} = \frac{\alpha}{z} \int_0^z \left(\frac{z-\psi}{z} \right)^{\alpha-1} \left[-\left(\frac{\partial \psi}{\partial n_1} + \left(\frac{\partial \psi}{\partial n_2} \frac{dn_2}{dn_1} \right) \right) \right] f(y)dy$$

Since $\frac{\partial \psi}{\partial q_i} = \frac{\partial V(\mathbf{q}, y) / \partial q_i}{\partial V(\mathbf{p}, \psi) / \partial \psi}$, using Roy's identity yields:

[10] $$\frac{\partial \psi}{\partial q_i} = -\frac{\partial V(\mathbf{q}, y) / \partial y}{\partial V(\mathbf{p}, \psi) / \partial \psi} x_i(\mathbf{q}, y)$$

For simplicity of notation, let us now define $\theta(\mathbf{p}, \mathbf{q}, y, \psi) \equiv \frac{\partial V(\mathbf{q}, y) / \partial y}{\partial V(\mathbf{p}, \psi) / \partial \psi}$

from which:

[11] $$\frac{\partial \psi}{\partial q_i} = -\theta x_i(\mathbf{q}, y)$$

Now, substituting [8] and [11] into [9] would give the following expression:

[12] $$\frac{dP_\alpha}{dn_1} = \frac{\alpha}{z} \int_0^z \left(\frac{z-\psi}{z} \right)^{\alpha-1} \left[\theta x_1 - \theta x_2 \left(\frac{\int_0^m (x_1 + \phi_1) f(y)dy}{\int_0^m (x_2 + \phi_2) f(y)dy} \right) \right] f(y)dy$$

where $\phi_i = \sum_k n_k \frac{\partial x_k}{\partial n_i}$.

In order to simplify [12] and to highlight the main results of the paper, let us also define:

[13] $$\xi_i = \frac{\int_0^m \phi_i f(y)dy}{\int_0^m x_i f(y)dy}$$

where, by definition, it is also known that:

[14] $$\bar{x}_i = \int_0^m x_i f(y)dy$$

With this simplification, expression [12] becomes:

[15] $$\frac{dP_\alpha}{dn_1} = -\frac{\alpha\theta}{z}\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}\left[x_2\left(\frac{(1+\xi_1)\bar{x}_1}{(1+\xi_2)\bar{x}_2}\right)-x_1\right]f(y)dy$$

In a more compact form, [15] can be rewritten:

[16] $$\frac{dP_\alpha}{dn_1} = -\frac{\alpha\theta}{z}\bar{x}_1(1+\xi_1)P_{\alpha-1}\left[\frac{\lambda_2}{\bar{x}_2(1+\xi_2)}-\frac{\lambda_1}{\bar{x}_1(1+\xi_1)}\right]$$

where $\lambda_i = \dfrac{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}x_i f(y)dy}{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}f(y)dy}$.

What then equation [16] reveals? Let us for the moment concentrate on the square bracket of that equation and assume that $\xi_i = 0$ (either because initial net tax rates are zero or because own and cross-price elasticities are negligible). In this particular case the square bracket of [16] would become:

[17] $$\left[\frac{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}x_2 f(y)dy}{\bar{x}_2\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}f(y)dy}-\frac{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}x_1 f(y)dy}{\bar{x}_1\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}f(y)dy}\right]$$

If one is ready to interpret $\left(\frac{z-\psi}{z}\right)^{\alpha-1}$ as a social weight, it is easily seen that each term of the square bracket is in fact the distributional characteristic (DC) of the good. However, the structure of DC is not the same as in Feldstein (1972) but it depends on the particular structure of the poverty index chosen. Furthermore, DCs in [17] would be calculated *up to the poverty line*, as poverty is here the specific aim of the analysis.

In this case, directions of reforms could be easily inferred. A revenue neutral increase of n_1 will be poverty reducing only if the DC of that good is lower than the corresponding DC of good 2. This is quite in line with the general meaning of distributional characteristics.

However, in this paper, an alternative yet interesting interpretation of [17] is given. For simplicity, let us assume that social weights are normalised so that the average social weight is equal to 1. By expanding the denominator of [17], the square bracket now becomes:

[18] $$\left[\frac{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}x_2 f(y)dy}{\int_0^m x_2 f(y)dy}-\frac{\int_0^z\left(\frac{z-\psi}{z}\right)^{\alpha-1}x_1 f(y)dy}{\int_0^m x_1 f(y)dy}\right]$$

In [18], the social weight does not vary according to the specific good, as that weight depends on the individual level of welfare. If households are ranked according to their income, that weight may be thought of as a decreasing function of income. A necessary and sufficient condition for an increase of n_1 to be poverty reducing is therefore:

[19] $$\left[\frac{\int_0^z x_2 f(y)dy}{\int_0^m x_2 f(y)dy}-\frac{\int_0^z x_1 f(y)dy}{\int_0^m x_1 f(y)dy}\right]$$

The most direct way to get information from [19] is suggested by Besley and Kanbur (1988), by noting that [19] corresponds to α=1 in [18]. Assuming α=1 yields:

[20]
$$\int_0^m xf(y)dy = \bar{x}$$
$$\int_0^z xf(y)dy = \bar{x}_P$$

where the first term (the denominators in [19]) is the mean consumption of x over the total population, while the second term (the numerators in [19]) is the mean consumption of the same good by poor people, i.e. *up to the poverty line*. This interpretation, as already suggested by Reutlinger (1985) and Besley and Kanbur (1988), makes clear that revenue-neutral increases in n_1 will be poverty reducing if the share of mean consumption by poor over total mean consumption of x_1 is lower than the corresponding share for the good x_2. Given revenue neutrality, it means that the good to be subsidised is identified by a larger fraction of consumption by the poor.

Yet, this interpretation does not make the result independent of the specific poverty line chosen, as mean consumption must be calculated up to the poverty line z, which is arbitrarily chosen. Changing the poverty line implies iterate the calculation in order to verify whether the poverty change is robust to alternative specifications.

Equation [16], as it is, can instead give information on the *direction* of the change of the poverty index for any poverty line, by noting that the difference in round brackets may in fact be interpreted as a difference between either pure or modified concentration curves, depending on ξ_i being zero or non-zero. In [19], the first term in round brackets may be interpreted as the concentration curve of good x_2, while the second term as the concentration curve of good x_1, both *truncated* at the level of the poverty line.

The proof may go along the lines of Yitzhaki and Thirsk (1990). To have a negative value of [16], for the first individual it must be that $\frac{x_2^1}{X_2} - \frac{x_1^1}{X_1} > 0$. Now for the second individual either $\frac{x_2^2}{X_2} - \frac{x_1^2}{X_1}$ is positive, and therefore the sum of the two differences is positive, or it is negative, so that the sum of the two may be either positive or negative. However, to be sure that the change is poverty reducing the sum of the two can only be positive, i.e. we must have: $\frac{\left(x_2^1 + x_2^2\right)}{X_2} - \frac{\left(x_1^1 + x_1^2\right)}{X_1} > 0$. If adding other households the cumulated sum (up to the max conceivable poverty line) of consumption of good 2 is everywhere greater than the corresponding sum for good 1, the underlying policy will be poverty reducing.

More precisely, if the concentration curve of good 2 is systematically above that of good 1, for all meaningful poverty lines (say up to a conceivable $\hat{z} = \max\{\mathbf{z}\}$, where $\mathbf{z}$ is a vector of poverty lines), increasing the net tax rate (e.g., decreasing subsidies) on good 1 and decreasing the corresponding net tax rate (e.g., increasing subsidies) on good 2 will be poverty reducing.

If this difference is positive over the whole range, [16] would be negative, signalling a poverty reduction. Once again it is worth noting the power of this interpretation. If condition [19] holds up to a given $\hat{z} = \max\{\mathbf{z}\}$, i.e. up to the highest conceivable poverty line, the direction of reform becomes robust to the choice of the poverty line. Furthermore, condition [19] is in fact independent of the specific structure of social weights. It means that if [19] holds it would hold for any poverty index of the FGT class. This result is trivial when α=1. In this latter case, equation [18] collapses to equation [19].

Relaxing the assumption $\xi_i = 0$ while maintaining the normalisation of social weights would instead give the following:

[21]
$$\left[\frac{\int_0^z \left(\frac{z-\psi}{z} \right)^{\alpha-1} x_2 f(y)dy}{\bar{x}_2(1+\xi_2)} - \frac{\int_0^z \left(\frac{z-\psi}{z} \right)^{\alpha-1} x_1 f(y)dy}{\bar{x}_1(1+\xi_1)} \right]$$

With the same line of reasoning, a sufficient and necessary condition to have a poverty reducing effect is:

[22]
$$\left[\frac{\int_0^z x_2 f(y)dy}{\bar{x}_2(1+\xi_2)} - \frac{\int_0^z x_1 f(y)dy}{\bar{x}_1(1+\xi_1)} \right]$$

By [13], ξ_i may be interpreted as the weight of own and cross-price effects on mean consumption. If cross-price effects are negligible and the good is inelastic, ξ_i approaches zero. If aggregate behavioural reactions are instead important, the denominator of [23] would signal that mean consumption must be corrected by a factor $(1+\xi_i)$. This would preserve the meaning of [23] as a difference of concentration curves, yet they should be best interpreted as *modified concentration curves* (MCCs), as $(1+\xi_i)$ is a scaling factor of mean consumption. If one knows aggregate reaction, it is still possible to infer poverty reducing directions of tax/subsidy reforms by applying scaling factor to mean consumption and then calculating MCCs. If the information is only partial, e.g. aggregate behavioural reactions are known for, say, good 1, by calculating MCCs, it would be possible to infer which is the critical level of the factor $(1+\xi_2)$ preserving a poverty reducing direction of tax/subsidy reform. Lacking reliable information on aggregate reactions for Belarus, the empirical section will show results under the assumption that ξ_i=0.

A STEP FURTHER: SUB-GROUP CONCENTRATION CURVES

Conditions [19] and [22] have been derived for the overall change of the poverty index. Yet, one can exploit the decomposable property of the FGT class of poverty indices in order to derive analogous conditions for subgroups of population. To this purpose, let us re-define the total poverty index as:

[23] $$P_\alpha = \sum_g \omega_g P_\alpha^g$$

where ω is the share of population belonging to group g and:

[24] $$P_\alpha^g = \int_0^{z_g} \left(\frac{z_g - \psi}{z_g} \right)^\alpha f_g(y)dy$$

is the FGT poverty index specific to the *g*-th group, with f_g being the income density function for group *g*. For simplicity of notation, and to easily get the meaning of the analysis, let us assume a common poverty line $z_g = \hat{z}$, $\forall$g. Results do not change if differentiated poverty lines are introduced.

Considering again a revenue-neutral change of the two net tax rates, equations [6] and [8] would still hold to describe the government's budget constraint. It amounts to assume that revenue-neutrality must be obtained over total population and not within each group. Following the same steps as above, yields:

[25] $$\frac{dP_\alpha^g}{dn_1} = \frac{\alpha}{\hat{z}} \int_0^{\hat{z}} \left(\frac{\hat{z} - \psi}{\hat{z}} \right)^{\alpha-1} \left[\theta x_1^g - \theta x_2^g \left(\frac{\int_0^m (x_1 + \phi_1) f(y)dy}{\int_0^m (x_2 + \phi_2) f(y)dy} \right) \right] f_g(y)dy$$

where variables have the usual meaning, but now some of them are specific to the *g*-th group. Now, rearranging terms as above, normalising social weights with mean equal to 1 and assuming again $\xi_i = 0$, $\forall$i, one can yield:

[26] $$\frac{dP_\alpha^g}{dn_1} = -\frac{\alpha\theta}{\hat{z}} \bar{x}_1 P_{\alpha-1}^g \left[\frac{\int_0^{\hat{z}} \left(\frac{\hat{z} - \psi}{\hat{z}} \right)^{\alpha-1} x_2^g f_g(y)dy}{\bar{x}_2} - \frac{\int_0^{\hat{z}} \left(\frac{\hat{z} - \psi}{\hat{z}} \right)^{\alpha-1} x_1^g f_g(y)dy}{\bar{x}_1} \right]$$

The necessary and sufficient condition for poverty reducing directions of reform is now:

[27] $$\left[\frac{\int_0^{\hat{z}} x_2^g f_g(y)dy}{\int_0^m x_2 f(y)dy} - \frac{\int_0^{\hat{z}} x_1^g f_g(y)dy}{\int_0^m x_1 f(y)dy} \right]$$

Each term of equation [28] is a concentration curve having now at the numerator the cumulated consumption attributable to the *g*-th group over the overall distribution of *y*, a sub-group concentration curve (SGCC). Note that [27] is now expressed as a change of the poverty index of the g-*th* group. By comparing concentration curves as in [27] the effects of a given tax/subsidy policy can now be examined by disentangling which group would gain and which one would lose. In equation [16] this is not clearly the case, as the poverty reducing direction is calculated in aggregate form.

Data

Data used in this paper comes from the Yearly Personal File (YPF) and the Yearly Household File (YHF) for 1997.[1] Surveys contain information on socio-demographic characteristics of individuals and households and on the main items of incomes (including in-kind incomes) and state transfers. Detailed information on households' expenditures are also available. Table 1 reports basic information on the main variables. According to the methodological notes of the surveys, the sample families are surveyed 17 times by an interviewer and data collection consists of two stages. In the first, the family keeps track of the expenditures it incurs every day during 14 days of each quarter, including food produced on the individual land plot or received as a gift. The second type of data collection is an interview during which data on non-food expenditures and incomes are collected. The statistical data are monthly averages for a year and are adjusted to consumer price index.

Directions of reforms for consumption subsidies

To the purpose of the analysis three subsidised goods have been chosen and expenditures on them equivalised using the OECD equivalence scale: rents and utilities (RU); health care (HC) and public transports (PT). Six groups of population have also been considered (in brackets the percentage of total population): workers with children (34.7 per cent); adults without children (32.2 per cent); singles (21.1 per cent); single parents (4.8 per cent); pensioners with children (3.3 per cent); other households with children (3.9 per cent).

From section 2, the conclusion has been drawn that an increase of the subsidy rate on a given good x_1 is poverty reducing if the concentration curve of that same good is everywhere above that of another good x_2, over the relevant range. Furthermore, to see whether a subsidy reduction has contradictory implications for different population groups, the analysis needs to be replicated for each group.

Before proceeding any further, it is worth noting the distribution of those expenditures across deciles of total income, as reported in figure 1. There is evidence that the highest decile consume proportionally more of all subsidised goods. It would mean that the efficiency score of the corresponding subsidies might be quite low, with a greater degree of leakage to richer households. From the point of view of the policy-maker, therefore, subsiding consumption is not a very effective policy, as consumption is correlated with income with many expenditure items. However, from the point of view of the social impact, simply eliminating subsidies may be a bad strategy; yet, there might be margins to redirect them in order to increase their anti-poverty effect.

In figure 1, the most disproportionate distribution is from public transports, with slightly more than 11 per cent on the first two deciles, while the most concentrated on low-income households is rents-utilities with 17 per cent on the first two deciles. With this information, one can now perform comparisons of the three subsidised goods: 1) rents and utilities *vs*. health care; 2) rents and utilities *vs*. public transports; 3) health care *vs*. public transport.

Figure 2 reports evidence for poverty reducing directions of reforms for total population, expressed as difference between concentration curves. The *x*-axis indicates percentiles of population, while the *y*-axis gives information on the difference between the concentration curves of the two goods. For each graph, two vertical lines are reported: that on the right side indicates the location of the average total income (including monetary transfers); the left line indicates, instead, the location of the 75 per cent of the median income.

Consider first the top graph of figure 1, where rents-utilities and health care are compared. The dominance of the first concentration curve occurs for a wide range of conceivable poverty lines, even though the two concentration curves intersect at the top of the distribution. In this case, increasing subsidies on rents and utilities and at the same time reducing subsidies on health may be safely considered as a poverty reducing strategy at balanced budget.

Things are even clearer for the other two graphs in figure 1. In both, the dominance occurs over the whole range. This means that increasing subsidies on either rents and utilities or health care, while decreasing those on public transport, may be poverty reducing for any poverty line.

[1] Both surveys are from the Ministry of Statistics and Analysis of the Republic of Belarus, whose kindness is gratefully acknowledged. Obviously, they do not bear any responsibility for both the analysis and the interpretation of the data.

Combining all results for total population means that subsidies should be reallocated to rents and utilities and decreased on the other two items. Adding the evidence from the third graph one can get that, if the choice is between health and public transport, health should be favoured most, while subsidies on pubic transport should be definitely reduced. As expenditures on public transport are dominated by the other two items, subsidies on them should be certainly withdrawn and money used to finance expenditures mainly on rents and utilities. Alternatively, money could also be recovered by reducing subsidies on rents and utilities for people above the poverty line and increased to those below that line, but this implies, quite obviously, administrative costs for a targeting scheme.

The clear-cut answers we observe from figure 2 can now be decomposed by population groups in figure 3. Obviously, an overall poverty reducing direction of reforms may conceal the fact that some population groups may lose and some may gain from the revenue-neutral change of consumption subsidies. Consider, for example, the previous comparison between health and public transport (HC-PT). For total population this difference was always positive, signalling that increasing subsidies on health and reducing them on transport is poverty reducing. Yet, if we check figure 3 we get that the same prescription does not hold for all groups. There is evidence that this direction of reform is actually poverty reducing only for married couples and other adults without children and singles. For pensioners with children the result is ambiguous, while for the other three groups the same reshuffling is poverty increasing, even though the intensity is of lower degree. Of particular interest for the policy-maker, for example, might be the observation that increasing subsidies on health care (while reducing those on public transports) does not help to relieve from poverty households with children, an information concealed by the graph in figure 2.

For the comparison between rents-utilities and public transports (RU-PT), which is definitely poverty reducing according to figure 2, there is: an almost neutral effect for workers with children (if not poverty increasing for increasing poverty lines); a poverty reducing effect in the other cases for any conceivable poverty line, with the exception of pensioners with children where results are again ambiguous. Looking at the decomposition by sub-groups, in this case, highlights the significant effect this policy could have on singles, which are the most benefited from an increase of the subsidy rate on rents-utilities.

About the comparison between rents-utilities and health care (RU-HC), which was poverty reducing for all conceivable poverty lines, the outcome by subgroups is again heterogeneous. Workers with children, single parents and other households with children would gain from the reform, while married couples-adults without children and singles would lose. This directly support the findings obtained comparing HC and PT. In both cases, it emerges that increasing subsidies in health care is a bad strategy if the aim of the policy-maker is to relieve households with children from poverty.

An analysis by groups may also help revealing the priority ranking within each of them. Consider first workers with children. For this group, the priority is to reduce subsidies on health care, while between rents-utilities and public transport the outcome is not very clear, with a slight support to increase those on RU. Ranking for increasing subsidies is therefore: RU≈PT>HC where ≈ means that SGCC gives insufficient information to rank directions of adjustment and «>» means priority on increasing subsidies.

For married couples and other adults without children, the SGCC of health dominates both public transport and rents-utilities, while that of RU dominates that of PT. The ranking is therefore HC>RU>PT.

For singles there are three clear prescriptions: RU dominates PT; HC dominates PT; HC dominates RU. Therefore, subsidies on PT should be reduced first. The ranking is now HC>RU>PT.

In the case of single parents, prescriptions are also very clear, with a ranking RU>PT>HC, while for pensioners with children no conclusions are possible, as all differences between SGCC cross the x-axis at least once well before the level corresponding to 75 per cent of the median income, i.e. a range where conceivable poverty lines may be set. Results, in this latter case, can be obtained only by fully specifying the poverty index and the poverty line.

Finally, in the case of other households with children, the situation is analogous to that of single parents. The ranking is therefore RU>PT>HC.

Conclusions

This paper has applied the correspondence between non-intersecting concentration curves and poverty reducing directions of reforms to sub-groups of population. The case analysed has been that of consumption subsidies on health care, rents-utilities and public transport in Belarus prevailing in 1997. The decomposition by sub-groups has revealed that, comparing with clear-cut poverty reducing directions of reforms obtained when considering total population, different groups may suffer a poverty increase for any conceivable poverty line.

Three findings may be of particular interest for the policy-maker. The first is that increasing subsidies on rents-utilities generally favours households with children, while, at the opposite, increasing subsidies on health care would favour those household types without children. The second is that subsidies on public transports are not a

priority for any group. Furthermore, they are always dominated by rents-utilities. Third, clear prescriptions by SGCC cannot be inferred for pensioners with children. When calculating poverty indices before and after a given reform for this specific group, one therefore must be aware that results might be very sensitive to the choice of the poverty line.

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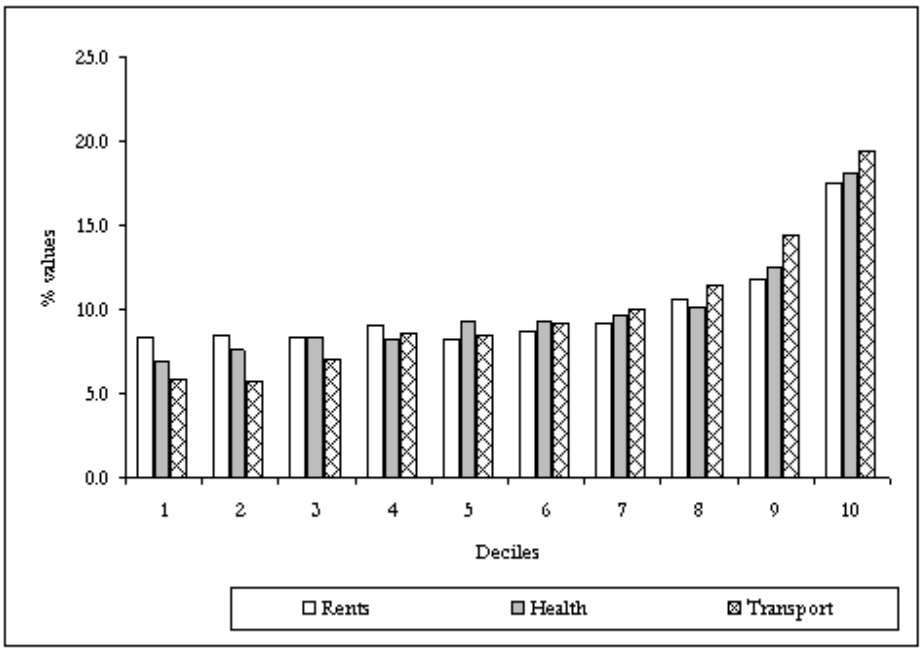
Figure 1 - Distribution of expenditures, by deciles



Source: Author's elaborations from YHF (1997).

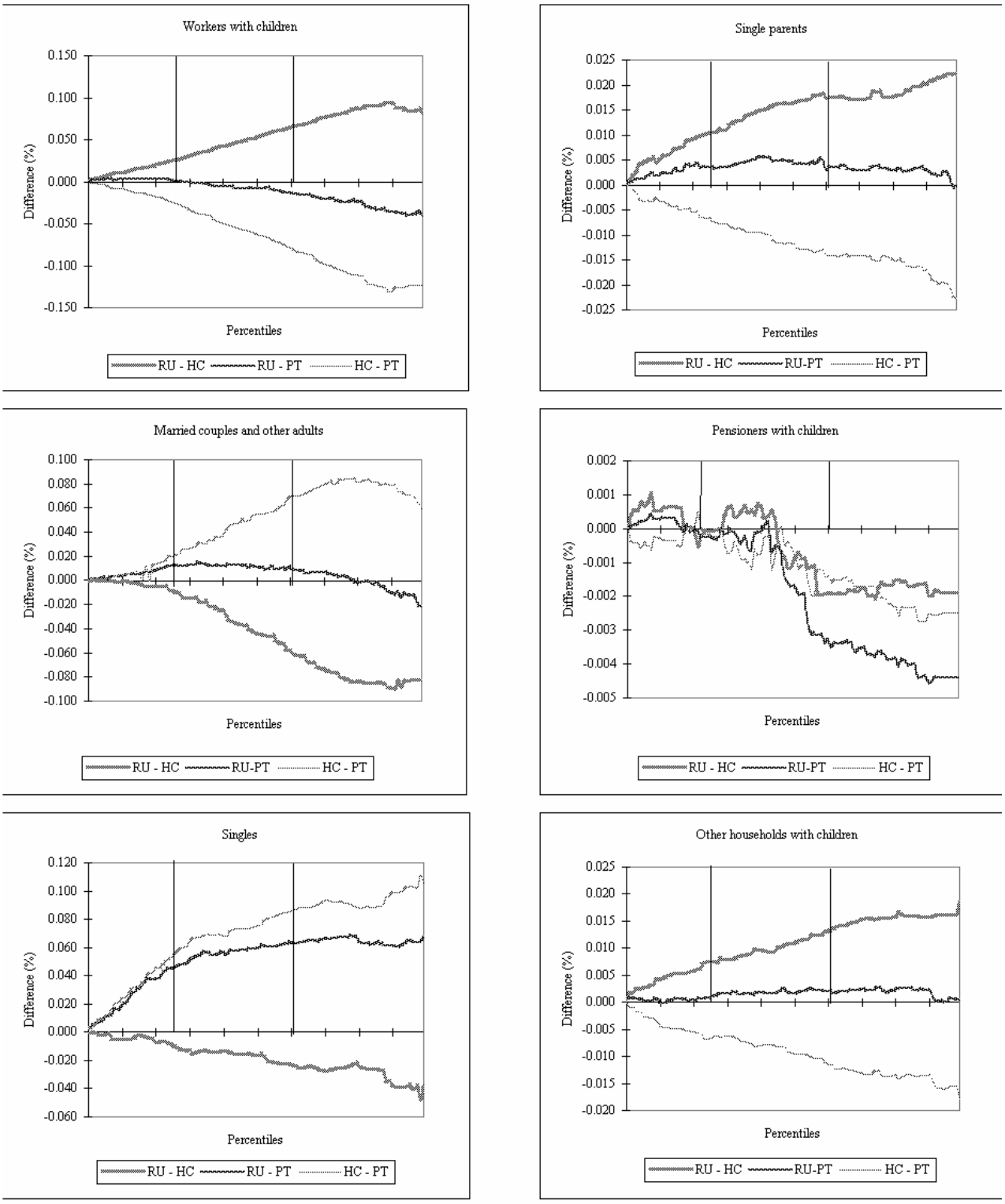
Table 1 - Summary information on samples and variables (*)

Number of households in YHF	4,918			
Number of households represented	3,414,177			
Modal worker position	Blue collar			
	MEAN	STD DEV	MIN	MAX
Household size	2.73	1.35	1.00	13.00
Total number of children	0.75	0.95	0.00	8.00
Number of earners	1.25	0.95	0.00	3.00
Age of head of household	50.91	15.64	18	94
Net wages (cash + inkind)	1,884	1,942	0	15,639
Total monetary income	3,767	2,308	320	68,066
In-kind income from plots	758	679	0	4,678
Food expenditures	1,720	996	73	8,016
Rent and utilities expenditures	147	136	0	2,110
Health expenditures	52	81	0	1,453
Public transport expenditures	79	99	0	2,006
Total expenditures	3,498	2,562	252	58,448

(*) Values are monthly averages for 1997

Source: Author's elaborations on YHF (1997).

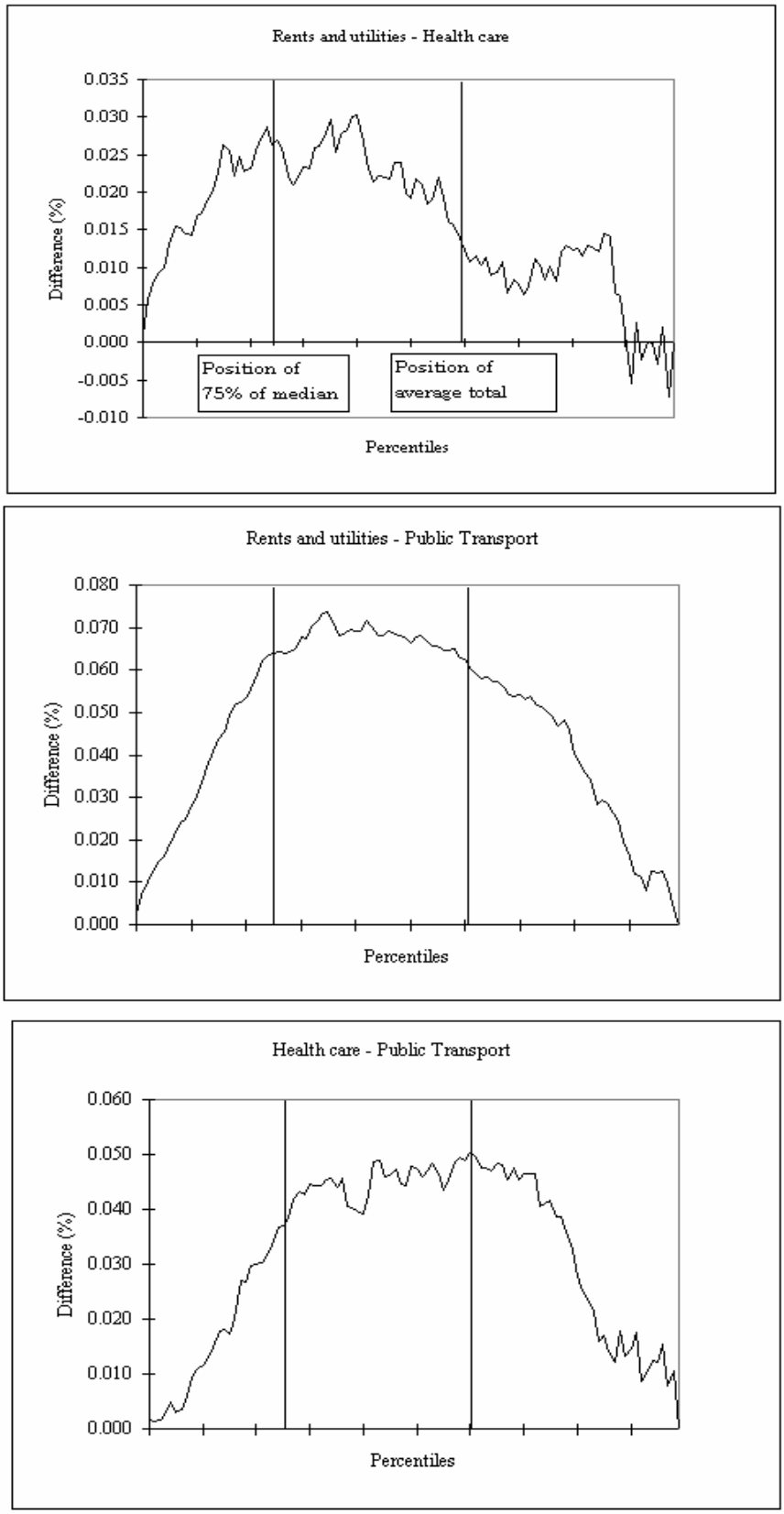
Figure 3 - Difference between concentration curves - Population groups



Legenda: RU = equivalised expenditures on rents and utilities
HC =equivalised expenditures on health care
PT =equivalised expenditures on public transport

Source: Author's elaborations from YHF (1997).

Figure 2 - Poverty reducing directions of reforms - Total population



Source: Author's elaborations from YHF (1997).